

## Ka-Band MMIC T/R Module, Phase I

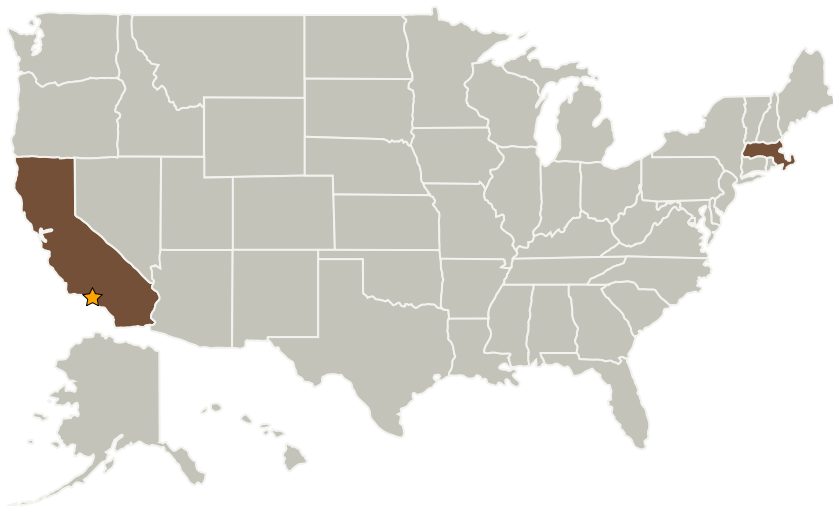
Completed Technology Project (2006 - 2006)



## Project Introduction

This proposal is specifically written to address the need for improved Ka-band T/R modules. The solicitation calls for investigation and development of core technologies that will significantly improve T/R module performance. Improvements needed include reduced power consumption, mass, and size. Hittite Microwave Corporation is a fabless semiconductor company that has been developing microwave monolithic integrated circuits (MMICs) for over 19 years. Hittite proposes three possible areas of focus for the SBIR program, transmitter power amplifiers, receiver integration or complete T/R functionality. By far the largest contributor to the size and weight of a T/R module is the power amplifier. Both GaN and MHEMT are new technologies that have the potential for substantial improvement over incumbent PHEMT technology. MHEMT is most suited to power levels below 4 Watts reverting to the higher power density GaN technology at higher power levels. Both MHEMT and advanced SiGeBiCMOS technologies such as IBM 8HP can be consider for receiver functions. Finally MHEMT strikes a good balance as a single technology platform for a moderate power level (<2 Watt transmit) T/R MMIC/module at 35 GHz. The proposal includes a technology summary as well as basic design considerations and examples of LNAs, PAs and phase shifters.

## Primary U.S. Work Locations and Key Partners



Ka-Band MMIC T/R Module,  
Phase I

## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission  
Directorate (STMD)

### Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

### Responsible Program:

Small Business Innovation  
Research/Small Business Tech  
Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Hittite Microwave Corporation	Supporting Organization	Industry	Chelmsford, Massachusetts

## Primary U.S. Work Locations

California	Massachusetts
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.2 Radio Frequency
    - └ TX05.2.7 Innovative RF Technologies